

**A FINANCIAL ANALYSIS FOR A  
SPINAL SURGERY SPECIALIZED TREATMENT SERVICE**

**A GRADUATE MANAGEMENT PROJECT**

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## **ABSTRACT**

The command group at Eisenhower Army Medical Center (Eisenhower) requested a financial analysis to determine which of two alternatives would be the more cost effective method for performing spinal surgery on CHAMPUS eligible beneficiaries living within a 200 mile area surrounding the hospital. The alternatives were to reimburse civilian health care providers for spinal surgery using money provided by Civilian Health and Medical Program of the Uniformed Services (CHAMPUS) or to designate Eisenhower as a Specialized Treatment Service for spinal surgery and bring the patients to Eisenhower.

This study evaluated the relevant costs associated with both alternatives over a four year period, fiscal year 1997 through 2000. The costs were inflated at various rates and reported in 1997 values using a discounted cash-flow analysis.

It was determined that establishing Eisenhower as a Specialized Treatment Service for spinal surgery would save \$510,352 in CHAMPUS dollars over the four-year decision period. Additionally, Eisenhower could recapture \$3,807,101 in third party insurance dollars over the same period. After paying off the estimated \$1,400,804 for equipment and orthopaedic appliances needed to start the project, the net present value of the savings for the stakeholders is \$2,916,649.

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## INTRODUCTION

The Military Health Services System (MHSS) is one of the world's largest health care organizations providing medical services to 8.2 million beneficiaries (Court-Johnson 1996) with operating costs of over \$15 billion annually (General Accounting Office 1995). The MHSS is a diverse, comprehensive, leading edge health care system that delivers world class care in settings from the forward edge of battlefields to state-of-the-art medical centers. Its primary missions are to maintain the health of active duty personnel and to be prepared to deliver health care during times of war (General Accounting Office 1995). The MHSS provides services, whenever and wherever needed, in support of military operations and to members of the Armed Forces, their families, and others entitled to Department of Defense (DoD) health care (Assistant Secretary of Defense for Health Affairs 1995).

Since the late 1980s, the military and its health care system have undergone great change in size, budget, and organization. The trend of building forces and facilities, prominent during the Cold War, changed to one of closure and downsizing. This change forced military leaders to develop innovative ways to provide affordable, high quality, accessible health care. Eisenhower Army Medical Center (Eisenhower), a military hospital located at Fort Gordon, Georgia, was restructured so that the Commanding General could concentrate more on regional health care issues. This restructuring process was in keeping with the emphasis of the health care industry to reduce duplication of services and provide care on a regional basis. Focusing on regional issues enabled the hospital Commander, operating in his capacity as the Army's Southeast Regional Commander, to cross level medical assets between military hospitals more efficiently, and better refer patients to the facility that best meets their health care needs. The restructuring of the hospital's organization was just one strategy the Commander implemented to keep the hospital

viable in a time of budget cuts and health care reform. Establishing Eisenhower as a Specialized Treatment Service<sup>1</sup> (STS) for various product lines was another.

At the same time the military health care system was downsizing, it followed the lead of the civilian health care industry and entered the world of managed care. The military's managed care program increased flexibility, affording military medical personnel the ability to maintain their personal readiness while assigned to a base hospital or clinic. This flexibility contributed to unprecedented collaboration among the three military medical departments as well as strengthened the partnerships built between the military and contracted civilian health care companies. The managed care initiative, joint service sharing, and partnerships with civilian health care organizations are designed to contribute to the survival of the MHSS. Survival also means changing by controlling costs and becoming more user friendly (Joseph 1996). A significant part of the managed care philosophy and strategy for survival is the establishment of centers of excellence.

Several centers of excellence existed prior to October 1995. However, it was after that time treatment facilities that provide specialized medical care were encouraged to apply for status as an STS. The Eisenhower Commander adopted this philosophy and requested that a financial analysis be completed to determine the most cost-effective way of treating the dependents of active duty military personnel and eligible retirees and their family members who require spinal surgery to correct an injury or other condition of the spine. This analysis would compare the present method of providing this support to that of creating a Spinal Surgery STS (spinal STS) at Eisenhower.

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<sup>1</sup> Called a center of excellence in the civilian healthcare industry, a Specialized Treatment Service (STS) involves medical care that is best delivered in centers of excellence to ensure the most favorable patient outcomes and to conserve resources. As a Specialized Treatment Service Eisenhower's catchment area is expanded from 40 miles to 200 for the medical procedures performed within the identified product line (Assistant Secretary of Defense for Health Affairs 1995).

Today in the 200 mile catchment area surrounding Eisenhower, the military relies primarily on civilian health care providers to perform the majority of the spinal surgeries. Using market research and financial analysis techniques, this study will determine if it is more cost effective to bring these patients into Eisenhower or to continue utilizing the civilian providers to perform spinal surgery.

### **Stakeholders and Their Missions**

Although the MHSS has many important missions, providing peace time health care is often the most visible. Peace time care includes all primary and specialty care, dental care, veterinary services, preventive medicine, environmental protection, and family support programs. The MHSS augments its own medical assets by using civilian health care providers and facilities. Prior to July 1, 1996 a non-active duty MHSS beneficiary living in Eisenhower's catchment area received medical care from a civilian provider, the Civilian Health and Medical Program of the Uniformed Services (CHAMPUS)<sup>2</sup> paid a percentage of the costs (OCHAMPUS 1994). As of July 1, 1996 the contract between DoD and Humana Military Healthcare Services (Humana) became effective. Humana now has input into the disposition of CHAMPUS dollars that would have been paid to civilian healthcare providers when Eisenhower patients were referred out of the MHSS.

A second mission, sponsoring graduate medical education, provides the military with an attractive method of recruiting and retaining active duty health care personnel. The graduate medical education programs are affiliated with over 120 universities and are the military's principle source of health care specialists. These programs also attract a comprehensive range of

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<sup>2</sup> CHAMPUS is the government program that pays for MHSS beneficiaries medical care when services are not available from one of the medical treatment facilities. CHAMPUS beneficiaries include dependents of active duty and retired military personnel under the age of 65, retired military personnel under the age of 65, and survivors of active duty or retirees under the age of 65.

patients that enable health care providers to maintain the skills that would be needed in time of war.

Readiness remains the MHSS' primary mission (McGee and Hudak 1995) and is the cornerstone of the MHSS (Assistant Secretary of Defense for Health Affairs 1995). The major objective of military medicine is promoting the health, fitness, and productivity of the deploying force. The MHSS must be prepared to support the full array of military readiness missions, including major regional conflicts, contingency operations, police actions, humanitarian assistance, and disaster relief (Assistant Secretary of Defense for Health Affairs 1995). It is the mission of preparing for war that makes the MHSS different from civilian health care organizations. This makes it essential to retain a basic infrastructure of inpatient facilities and teaching centers essential during this time of downsizing (McGee and Hudak 1995).

The MHSS is made up of medical departments from three services, the Army, the Air Force, and the Navy. In October 1994, the Army's Medical Department, created eight<sup>3</sup> regional headquarters under the command and control of the United States Army Medical Command (MEDCOM). MEDCOM includes more of the Army Medical Department than did its predecessor, Health Services Command, and has clearer lines of authority and more manageable control spans allowing for more efficient use of resources (The MEDCOM 1996). It links missions and functional areas and eliminates previous overlap, inefficiencies, and operational voids (The Atkins Agency 1995). The major focus of each regional headquarters is readiness and coordination with active and reserve components in preparation for deployment. This regional focus allows MEDCOM to reduce, or eliminate duplication of services and, thus, better accomplish its missions including readiness, providing peace time care, and supporting graduate medical education. MEDCOM performs the majority of its graduate medical education and

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<sup>3</sup> In 1995 the number of regional commands was reduced to seven.

peace time care missions in Army hospitals. Eisenhower has a direct part in graduate medical education through its 12 residency programs and that graduate 66 residents yearly (Vigna 1997).

Eisenhower, is an academic medical center located near Augusta, Georgia, and serves as a regional referral center for MHSS beneficiaries living in the southeastern United States. When the medical needs of patients exceed the capabilities of the smaller military hospitals in the region they are referred to Eisenhower. Through the years Eisenhower has enjoyed a close working relationship with the Medical College of Georgia and the Veterans Affairs Medical Center of Augusta. These affiliations allow Eisenhower to better serve its beneficiary population through joint venture sharing agreements that foster better use of resources for all the involved parties.

In addition to his responsibility for fulfilling the graduate medical education and referral center missions, the Commander of Eisenhower is also responsible for medical operations in MEDCOM's Southeast Regional Medical Command. In this role, the Commander has command and control over seven Army hospitals and three health clinics serving more than 2 million beneficiaries in Alabama, Florida, Georgia, Kentucky, Mississippi, South Carolina, Tennessee and Puerto Rico. The missions of the Southeast Regional Medical Command include maintaining high levels of medical readiness, providing executive level leadership for active duty medical facilities, integrating all medical activities to include the Reserves, and maintaining a world class beneficiary support system (The MEDCOM).

The Eisenhower Commander is also the Lead Agent of TRICARE<sup>4</sup> Region 3 overseeing the military's new managed care program in Georgia, South Carolina, and parts of Florida. The Lead Agent is staffed with personnel from the Army, Navy and Air Force. Its personnel are the

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<sup>4</sup> DoD divided the globe into medical regions for the purpose of overseeing TRICARE, the military version of managed care. Military personnel located at each regional Lead Agent office negotiated a contract with a civilian healthcare organization and together, they are responsible for providing medical care to MHSS beneficiaries.

liaisons between DoD and Humana<sup>5</sup>, the contracted health care organization. Lead Agent personnel also monitor civilian health care networks that supplement the military medical resources and ensure maximum utilization of military facilities. The military services provide more cost effective peacetime health care at their military treatment facilities than do health care providers in civilian facilities (The Atkins Agency 1995). Because of the federal government's economies of scale and employees that are salaried rather than paid through a fee-for-service method, efficient use of the military facilities often produces an overall reduction of expenditures for medical care for both DoD and the contractor.

As the primary contractor, Humana will provide oversight and will assume full operational and financial responsibility for the performance of the TRICARE contract within Region 3 (Humana Military Healthcare Services 1996). Humana's primary mission is increasing profits for its investors. Any decision made by a commander of a military hospital within Region 3 regarding how and where beneficiaries receive care has a direct impact on Humana. Under the terms of the contract between Humana and DoD, Humana controls CHAMPUS money. Therefore, whenever care is provided outside of a military facility and CHAMPUS dollars are expended, Humana's profits are likely to be decreased.

### **CONDITIONS PROMPTING THE STUDY**

By the end of the 1980s, plans to reduce the size of the military were implemented and DoD underwent drastic reductions in personnel and in its operating budget. United States military installations around the world, important during the Cold War, began to close as units deactivated or relocated. As the total force downsized, the MHSS was proportionately reduced.

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<sup>5</sup> DoD awarded the TRICARE contract in Region 3 to Humana Incorporated, of Louisville, Kentucky. Humana originally operated both managed care plans and hospitals. However, as of March 1, 1993, it had divested itself of all hospital ownership and now focuses only on managed care. Today it is one of the nation's largest managed care companies, with more than 2.4 million members currently enrolled in its plans. Due to the size and scope of the DoD market, Humana created a wholly owned subsidiary, Humana Military Healthcare Services to concentrate exclusively on military health care initiatives.

In some areas the number of doctors, nurses and medical technicians has declined as much as 50 percent. As a result of the downsizing efforts, 35 percent of the military hospitals that existed in 1987 will be closed by 1997. Yet, the total number of people seeking health care through the MHSS has dropped by only 9 percent (Department of Defense 1996).

Downsizing reduced the younger and healthier active duty population, but did not do away with the health care requirements of other beneficiaries, such as retirees and their dependents. Additionally, active duty personnel who left the service frequently did so under the terms of incentive programs that offered continued health care by the MHSS for themselves and their families. This created shortfalls in the MHSS' ability to meet its missions. Simply stated, the demand for health care began to exceed the system's capacity to deliver it (Department of Defense 1996). Pressures of downsizing, the rising cost of health care, national health care reform, the Section 733 Study<sup>6</sup> directed by Congress, and the requirement to maintain a trained and ready medical force to support combat troops, forced the military to change health care delivery methods (TRICARE Marketing Plan 1996).

The MHSS had recognized the need to change from the traditional health care delivery system model with the acute care, inpatient facility at its epicenter. Various military managed care initiatives tested throughout the 1980s (Court-Johnson 1996) indicated that the MHSS could adapt to the trend toward the capitated managed care model of the civilian health care delivery system (McGee and Hudak 1995). These initiatives eventually evolved into a comprehensive DoD program called TRICARE, a triple-option health delivery model that integrates health services for the nation's MHSS eligible beneficiaries. It has elements of the earlier initiatives and

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<sup>6</sup> The "Section 733 Study" refers to the analysis conducted pursuant to that portion of the FY 1992 and 1993 National Defense Authorization Acts where Congress requested the US Department of Defense Office of Program and Analysis and Evaluation to conduct a comprehensive study of the military medical care system. The official title of the study conducted as a result is "The Economics of Sizing the Military Medical Establishment" (1994).

brings together the health care delivery systems of each military service, as well as CHAMPUS (Court-Johnson 1996).

TRICARE provides medical care to MHSS beneficiaries through the direct care system, through contracts, and through outsourcing arrangements. In addition, it allows the MHSS to maintain personnel with the skills necessary to support wartime and other readiness requirements (Strategic Thinking Assumptions 1995). The philosophy of TRICARE is to alter provider and consumer behavior to optimize health care quality and access while constraining cost escalation (McGee and Hudak 1995). Once TRICARE is completely implemented, it will give the military a chance of surviving against shrinking budgets and rising CHAMPUS expenditures (Court-Johnson 1996).

Today, the downsizing of the active duty force continues to apply pressure on the MHSS. Current staffing levels of military hospitals may not be sufficient to meet the projected demand for health care services (McGee and Hudak 1995). By 1997, the Army Medical Department will have shrunk by 31 percent while the beneficiary population will have decreased by only 11 percent (The Atkins Agency 1995). In addition, DoD is projecting nearly a 5 percent decrease in its overall health care budget for fiscal year 1997. As bases continue to close, the Pentagon also expects to reduce spending by military treatment facilities by 9.4 percent, to less than \$3.3 billion, and to cut spending for care at private-sector facilities by 1.7 percent, to \$447.6 million (Gardner 1996). Because of these and current budget reductions, the MHSS must continually search for ways to provide more cost effective health care. One such way is through the development of STSs.

### **Specialized Treatment Services**

The MHSS has several world renown centers of excellence to include the Armed Forces Institute of Pathology, the Walter Reed Army Institute of Research, and the Burn Center at



Brooke Army Medical Center (The Atkins Agency 1995). An MHSS facility must meet specific criteria to qualify as an STS for a selected product line (Assistant Secretary of Defense for Health Affairs 1995). These criteria are: (1) the selected product line includes complex procedures using the Diagnostic Related Group scale; (2) clinical excellence is demonstrated for the product line when compared with national standards; (3) government money is saved when compared to TRICARE expenditures for the same services or procedures; and (4) required equipment costs over \$1 million (Assistant Secretary of Defense for Health Affairs 1995).

Because spinal surgery meets these criteria, the STS designation for Eisenhower for these procedures could potentially save the government money by recapturing CHAMPUS expenditures. It is this emphasis on recapturing CHAMPUS money and the renewed focus on efficiency through the practice of medicine on a regional basis that prompted this study.

### **STATEMENT OF THE RESEARCH QUESTION**

Leaders at Eisenhower, the Southeast Regional Medical Command, and the TRICARE Lead Agent Region 3 wanted to know the most cost-effective method for performing spinal surgeries. This study will determine which of two alternatives for CHAMPUS beneficiaries living in the 200 mile catchment area surrounding Eisenhower is the more cost effective. The alternatives are 1) "status quo", continuing to pay civilian health care providers using CHAMPUS money and 2) developing a Spinal STS at Eisenhower. Presently, the majority of the clinical requirements for spinal surgery within the Southeast Regional Medical Command and TRICARE Region 3 are being met in each military hospital's 40 mile catchment area, using local civilian providers.

### **LITERATURE REVIEW**

Current literature supports the importance of the proposed regional Spinal STS at Eisenhower. Today the health care industry is scrambling to develop cost-effective solutions for

spiraling medical cost problems and centers of excellence are one of the latest developments to emerge (Meyer 1996). The STS concept which, as previously stated equates to the civilian "centers of excellence," is rapidly taking its place as an effective way to provide highly specialized medical care. High cost, high volume specialties such as orthopedics and neuroscience are in a position of evaluating the costs, and in some cases, the appropriateness of medical practices in response to payer scrutiny and provider selection processes. By managing patients strategically, both the neuroscience and orthopedic service lines can provide substantial revenue, as well as the opportunity to achieve a competitive position in a managed care environment (McGinnity and Pluth 1994).

The health care industry has used centers of excellence as the preferred method for delivering high quality, specialized care for some time. At a 1987, meeting sponsored by the Institute of Medicine, regarding how to best provide care to geriatric patients, it was concluded that this would best be accomplished in centers of excellence. Meeting attendees recommended funding geriatric centers of excellence in order to mobilize and focus scarce resources, provide sites for training new physicians, and enhance creative interaction among scientists in diverse research areas (Kowal 1994).

A center of excellence is characterized by a perception of high-quality medical care. However, quality care cannot be based on past reputation but requires that hard data be gathered by advanced information systems (DeBakey 1993). Quality medical care is measured by consistent, successful, and predictable clinical outcomes, which are a result of appropriate diagnostic and medical-surgical procedures (Rogers and Bengel 1994). Health care organizations seeking to establish themselves as centers of excellence must demonstrate superior outcome management through research, education, treatment programs, quality improvement, and outcome studies. Outcome studies are based on three sets of variables: (1) clinical findings

measured by health care providers; (2) function and quality of life as reported by patients; and (3) utilization of health care services reported by both patients and providers (Meyer 1994).

Medical centers of excellence continue to be a cost-effective method for treating conditions such as spinal cord injury, cancer, diabetes, asthma, and other serious and chronic illnesses. It serves both patients' and payers' best interests to send the severely injured or chronically ill to facilities with outstanding success rates. Those facilities that provide treatment with measurably superior outcomes have the right, perhaps even the responsibility, to promote their progress in their respective fields of specialty (Meyer 1994). Demands on bona fide centers of excellence are likely to grow as their expertise is tapped to aid the current movement to develop and implement practice protocols (Rogers and Bengel 1994).

As a teaching facility, Eisenhower, like any other academic medical center operating as a center of excellence for certain medical specialties, faces unique challenges. Academic centers, entrusted with the education of the nation's health manpower, have enjoyed specially protected subsidization to offset the costs of education and training for medical education (Lepoff 1995). The major challenge faced by academic medical centers today is maintaining the structures and funding required for high-quality teaching and research programs while developing a service delivery that is competitive with the private sector (Kralewski et al 1995).

Typically, academic medical centers encompass a variety of entities including a hospital, a faculty practice plan, ambulatory care facilities, and in some cases a health maintenance organization. They tend to be more expensive than their community counterparts because of their teaching function, treatment of a sicker mix of patients, and their inefficient practice styles (Fox and Wasserman 1993). Additionally, they are often located in declining urban neighborhoods and serve more than their fair share of Medicaid and Medicare recipients and the

uninsured (Patterson 1995). In many urban areas, university medical centers offer few services that are not available in the community and from specialists in private practice.

This is creating a highly competitive environment. There is growing concern that teaching hospitals and medical faculties will not be able to compete, since their teaching programs both increase the costs of care and create an environment that is often less than user-friendly. Additionally, as a result different of forces that are reforming the health care industry, academic medical centers find themselves at the mercy of several new demands including:

**Lower Cost.** Academic medical centers are a high cost environment because of a greater utilization of resources, resulting from the training situation; higher patient acuity; and, in many cases, a large case burden of patients that are underinsured and medically undeserved.

**Reduced Utilization.** The emphasis of managed care organizations on reducing utilization by payment incentives, such as capitation, is underrepresented in most academic medical centers.

**Organizational Effectiveness.** The rapid shifts in the health care marketplace demand quick, effective organizational responses to maximize opportunity and market share. Academic medical centers are highly complex organizations that often have relatively weak center administrative capabilities. Such organizations are hard pressed to react quickly.

**Organizational Flexibility.** The marketplace also demands from health care providers the capability to respond with flexibility to a multitude of differing insurer-payer-provider relationships. The size and complexity, as well as their ownership by universities or governments, severely limit the flexibility of academic medical centers in entering into these various types of contractual relationships (Lepoff 1995).

Consequently the question remains: Can academic medical centers compete with service-oriented community physicians and hospitals (Kralewski et al. 1995)?

If academic medical centers are to compete with hospitals and health systems that have minimal teaching and research goals, they must offer competitive prices and quality outcomes (Nauert 1995). They must also develop regional, integrated health care systems that incorporate group practices, satellite clinics, community hospitals, and other health care facilities and

services. Because the development of health care networks will almost certainly be based in the academic health center, and since there must be an adequate patient population to educate future physicians, the hospital must support the academic program to ensure its own continuing success (Burrow 1993). Finally, consideration should be given to establishing a name-brand managed care company (Nauert 1995), perhaps in conjunction with a major carrier.

Managing the business of health care is difficult for any organization, but it is especially difficult for academic medical centers. Academic medical centers depend heavily on patient revenues and this is creating stresses in areas with a high penetration of health maintenance organizations (Fox and Wasserman 1993). Now because of managed care and other market pressures, academic medical centers that were once the leaders in the development of modern medicine are in jeopardy of losing their central role. In geographical areas that were at the forefront of the managed care revolution, some academic medical centers are already reeling (Goldman 1995). Market forces are diverting money from their primary mission of direct patient care into business profits (Kassirer 1994). Traditional sources of revenue are drying up as the market braces for stiffer competition, prepares for legislative reforms, and searches for equitable solutions to the problem of medical liability (Patterson 1995).

Meanwhile, managed care is growing every day as employers offer a variety of incentives and incitements. Medicare and Medicaid are on the verge of a managed care explosion as federal and state governments are finding value, cost-efficiency, and good service through enrollment of their beneficiaries in health maintenance organizations (Patterson 1995). While academic medical centers are going to be dramatically affected by the changes taking place in the health care delivery system, especially by managed care programs, there is no technical reason why they cannot adapt to these changes and successfully compete in that environment. Teaching programs

will need to be reconfigured, and services will need to be more price-competitive and more user-friendly (Kralewski et al 1995).

With the end of cost-based reimbursement and the advent of prospective payment, most academic medical centers are now turning to a strategy of selling high-technology "product lines" as a means of surviving in a new competitive market (Chessare and Herrick 1996). The efficiency and quality of medical care are greatly enhanced, and considerable savings are realized if most patients requiring highly specialized procedures are channeled to centers of excellence with an established track record of providing excellent care instead of being scattered among hospitals. By encouraging such patients to use centers of excellence, wasteful duplication of equipment and the performance of procedures by relatively inexperienced personnel is greatly reduced (DeBakey 1993). Employers, benefit consultants, and physician groups that include centers of excellence in their current benefits design and contracting programs will spend less money on specialized treatments for their patients (Meyer 1994).

### **Military Studies**

A study conducted at Bayne Jones Army Community Hospital, Fort Polk, Louisiana examined the efficiency of two case management programs for inpatient psychiatric services provided at civilian health care facilities. This study was designed to determine which program best managed CHAMPUS payments made to local civilian providers for psychiatric referred to them by Bayne Jones medical staff. One program was supervised by military personnel, the other by a civilian contractor. The researchers found that the military case managers at Bayne Jones more effectively controlled costs than did the contractor.<sup>7</sup> The military case managers saved more money despite not having the same freedoms as the contractor. Given the same guidelines

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<sup>7</sup> The contractor had freedom in management that the military case management program did not. These freedoms were the ability to direct certain patients to specific hospitals, to engage in local utilization review to certify medical necessity need for admission and continued stay, and to deny payment when services were available through the military hospital.

as the contractor the difference could have been more dramatic (Carter and Van Fleet 1995).

This study also demonstrated that by utilizing a military hospital to its full capacity and carefully regulating care provided by civilian providers, hospital commanders can produce significant CHAMPUS savings.

In another military study researchers examined certain aspects of care provided to patients with cystic fibrosis, to include where they received treatment. Among the lessons learned from this study was that the number of MHSS beneficiaries with cystic fibrosis could potentially overwhelm the system as it is configured. In this era of military downsizing, the capability of military physicians to act as either health care providers or case managers for chronically ill patients is severely limited. Shortages of physicians, as well as physician relocation and turnover, contribute to the lack of consistent care for beneficiaries with chronic diseases like cystic fibrosis.

The researchers believe one solution to this problem would be to create an STS and a system of satellite facilities for cystic fibrosis patients. This system, in conjunction with military Exceptional Family Member Program<sup>8</sup>, would assist in the transfer of military families who have a child with cystic fibrosis to an installation that can provide support to the patient. Such a system would also improve coordination of services with civilian agencies and other military hospitals (Callahan, Fitzsimmons and Schidlow 1994).

### **Eisenhower Cardiothoracic Specialized Treatment Service**

Eisenhower's Managed Care Department, in collaboration with personnel from the Region 3 Lead Agent, wrote the business plan that lead to the first DoD Cardiothoracic STS (Xenakis 1996). The market research techniques used to develop the Cardiothoracic STS

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<sup>8</sup> The Exceptional Family Member Program (EFMP) is designed to coordinate assignments for military personnel who have a family member with special medical requirements. The EFMP assigns the military member to an installation with medical assets that can support the special needs of their family member.

proposal, were utilized to design the financial analysis for the Spinal STS. Using the format required by the Office of the Assistant Secretary of Defense for Health Affairs<sup>9</sup> central funding support worksheet for STSs (Appendix 1), a market analysis of the 200 mile, STS catchment area<sup>10</sup> surrounding Eisenhower was conducted. Data collected during the market analysis phase of the study were examined and it was determined that a Cardiothoracic STS would be more cost effective than paying for the same procedures at a civilian facility.

The data for the cardiothoracic STS were gathered and organized using six diagnostic related groups (DRGs)<sup>11</sup>. DRGs are an important component for determining how much the Health Care Financing Administration will pay hospitals for services rendered to Medicare eligible patients. Like Medicare, CHAMPUS also uses the DRG system to calculate payments for health care provided by civilian providers (Carter et al 1994). For the cardiothoracic study DRGs were used to determine how much the government paid for services rendered by civilian providers. Additionally, estimates were made using DRGs to predict how much Eisenhower could bill private insurance companies for cardiothoracic surgeries provided to patients who carry insurance to supplement CHAMPUS. These estimates were made by multiplying the relative weight assigned to each DRG by the billing rates as prescribed by Health Affairs.

The market analysis provided information about the overall beneficiary population living in the catchment area, and more specific data about the patients who had undergone

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<sup>9</sup> The Assistant Secretary of Defense for Health Affairs is responsible for the MHSS. For this study this entity is referred to as "Health Affairs."

<sup>10</sup> Eisenhower's 200 STS catchment area covers mostly Georgia and South Carolina and includes nine military hospitals (Appendix 2). Without an STS designation, each separate hospital issues statements of nonavailability for services exceeding their capability. With STS designation, Eisenhower would issue the statements for the hospitals within the 200 mile catchment area.

<sup>11</sup> DRGs classify patients into clinically cohesive groups that demonstrate similar consumption of hospital resources and length of stay patterns. DRGs can, among other things, assist in evaluating the utilization of hospital services and compare physician and departmental practice patterns. (St. Anthony 1996). Each DRG has an assigned weight, called the relative weight, that reflects the resource consumption associated with each DRG. The higher the relative weight, the higher the payment to the hospital (St. Anthony 1996)



cardiothoracic surgery. This information included; (1) the number of patients who had surgery captured by one of the six targeted DRGs (2) the cost of those surgeries (3) and the distances the patients would have to travel get to Eisenhower.

These data were compared to the estimated costs to Eisenhower for developing a cardiothoracic STS. Costs to start the cardiothoracic STS included additional personnel, equipment, and patient travel and lodging reimbursements. When these cost were compared to the CHAMPUS expenditures for the same period, savings could be realized if the same number and types of procedures were completed at Eisenhower, and designation as a cardiothoracic STS was solicited and ultimately granted by Health Affairs.

In the past decade the MHSS has experienced many of the same challenges confronting the nation's health care system to include increasing costs and uneven access to health care services. Post cold-war contingency planning scenarios, efforts to reduce the overall size of the nation's military forces, federal budget reduction initiatives, and base closures and realignments have heightened scrutiny of the size and makeup of DoD's health care system (Government Accounting Office 1995). As a result, many military medical centers and community hospitals have either closed or downsized, and several were notified that the graduate medical education mission would be transferred to another facility.

These articles and studies address the trend toward centers of excellence in both the MHSS and civilian health care organizations. By reducing duplication and creating centers of excellence, both systems can provide sorely needed medical services with greater efficiency. The challenge for leaders is to prepare for the inevitable transition to managed care so they can then guide health care organizations to a new, more competitive position while still maintaining high-quality education and research functions (Kralewski et al 1995). To ensure that the military can meet its graduate medical education and readiness missions, the MHSS must blend the

efficiencies of the emerging civilian delivery system with the necessity of maintaining inpatient military facilities (McGee and Hudak 1995). Establishing carefully planned STSs is one way to accomplish this task.

## **RESEARCH METHODS AND PROCEDURES**

In his book "Essentials of Healthcare Marketing" (1996), Berkowitz suggests that the key members of a health care organization should be included during the planning phase of any project to help assure its success. By bringing key personnel together at the beginning, leaders can ensure that important aspects are discussed and that a strategy for completing the project is formulated. At Eisenhower, a process action team was formed to facilitate the Spinal STS Study. The team was made up of the Deputy Commander, the Chief of the Surgical Department, an orthopaedic spine surgeon, a neurosurgeon, and representatives from Managed Care Department.

The team set the parameters for the study, developed certain assumptions, and determined which costs associated with the two alternatives would be relevant to the decision. The parameters for the study included the fact that: (1) the analysis would cover a four year period beginning with fiscal year 1997 and ending with fiscal year 2000, a time period selected because it is the time remaining under the present contract with Humana; (2) either decision would impact not only Eisenhower, but also the MHSS and Humana; (3) the analysis would be only concerned with cost associated with spinal surgery for CHAMPUS eligible patients living in the catchment area; and (4) only surgical procedures listed under DRGs 004 - Spinal Procedures, 214 - Back and Neck Procedures with Complications, and 215 - Back and Neck Procedures Without Complications, would be examined.

The assumptions made by the process action team were: (1) if the STS option is selected, the phenomenon of moral hazard<sup>12</sup> will not effect workload in future years (2) the equipment required for the STS alternative will be procured during fiscal year 1997 and the Spinal STS will become operational at the beginning of fiscal year 1998 (3) if the Spinal STS alternative is selected, sufficient operating room and ward space is available at Eisenhower to accommodate an increased number of spinal surgeries and therefore, no other services would be displaced and (4) that military surgeons can handle an increased number of spinal procedures.

To compare the two alternatives, the process action team discussed what information was necessary and which costs were relevant. It determined that information needed for the status quo option included: (1) finding a base line year for gathering data and costs; (2) from that year, finding the number of CHAMPUS-patients who had spinal surgery and the cost to the government for those procedures; (3) determining the number of CHAMPUS eligible patients who resided in the STS catchment area during the base line year; (4) finding population estimates for 1997 through year 2000; (5) determining how much money health insurance companies contributed for the surgeries<sup>13</sup>; and (6) establishing an inflation rate to estimate future CHAMPUS costs.

Information needed for the STS alternative included: (1) the base line year population and surgical workload data; (2) the cost of additional medical equipment needed at Eisenhower to establish a spinal STS; (3) the cost of additional staff needed at Eisenhower to establish a spinal STS; (4) the cost of operating room supplies used during spinal surgeries; (5) the cost of orthopaedic appliances used to fuse and stabilize spines; (6) the cost to other Eisenhower

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<sup>12</sup> Moral hazard is the phenomenon where consumers demand progressively more of a product the less they pay for it. Consumers of MHSS services may pay for services with money such as copayments and deductibles and with their time (Holmes 1996). Thus, if MHSS beneficiaries do not have to pay for spinal surgery there could be increased workload.

<sup>13</sup> This so called "third party insurance" money would be used to predict how much Eisenhower, on behalf of the MHSS, could collect from the insurance companies.

services<sup>14</sup> that would be impacted by an increased volume of spinal surgeries; (7) the costs for patient travel, lodging and per diem; and (8) the inflation rates for the various costs.

Because the costs of the two alternatives spanned a period of more than one year, a discounted cash flow analysis<sup>15</sup>, as described in Gapenski's "Understanding Health Care Financial Management," (1993) was used to compare the two. After inflating the costs associated with the two options for each year of the four-year decision period, the totals were discounted backwards into 1997 dollars. The net present values of the two alternatives were compared to determine which was more cost effective.

Two additional financial analyses were requested by the process action team to compare the two alternatives. The first was a sensitivity analysis. This test was used to determine the affect of different inflation rates on the net present value of the spinal STS option. Inflation rates for the spinal STS option were increased by different amounts to determine when option would become more cost effective than the other. The second test conducted was a break-even analysis<sup>16</sup>. The process action team wanted to see how many surgeries, based on an average cost per procedure, could be performed before one option became more cost effective than the other.

## RESULTS OF THE STUDY

Establishing Eisenhower as a spinal STS proved to be the more cost effective alternative. The net present value of the status quo alternative is \$5,930,028, while the net present value of spinal STS alternative is \$5,419,676. The spinal STS alternative would therefore save

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<sup>14</sup> For this analysis these services are referred to as service centers. These are services that provide necessary functions or products to support the spinal STS and consume resources at their own level.

<sup>15</sup> Also called a "time value of money" analysis, a discounted cash flow analysis allows for comparisons of amounts of money paid at different points in time by discounting all dollar amounts to present (Finkler 1994) year dollars, or the net present value. It is vital to most financial decisions because they normally involve future cash flows (Gapenski 1993). This type of financial analysis considers not only inflation, but also risk and deferred consumption.

<sup>16</sup> A break-even analysis is a technique for determining the minimum volume of output (such as spinal surgeries or outpatient visits) necessary in order for a program or service to be financially self-sufficient (Finkler 1994).

Eisenhower and Humana \$510,352 in CHAMPUS money over the four year decision period. Further an estimated \$3,807,101 in third party insurance payments that would have gone to civilian health care providers under the status quo option, would be available to Eisenhower and the MHSS under the spinal STS option. The savings plus the third party insurance dollars total \$4,317,453, before paying start-up expenses. After repaying \$1,400,804 needed for start-up equipment and orthopaedic appliances, \$2,916,649 would be available under the spinal STS alternative when compared to the status quo.

### STATUS QUO ANALYSIS

Analysts from Eisenhower and the Region 3 Lead Agent Office examined data obtained from the Retrospective Case-Mix Analysis System (RCMAS)<sup>17</sup>, an MHSS data base that organizes and maintains information about CHAMPUS claims. Through discussions with the analysts, and by examining the data from fiscal years 1994, 1995, and 1996, the process action team determined that fiscal year 1995 was the best to use as a base line year. Data used for both alternatives will be obtained from the baseline year and inflated as required over the four year decision period.

Market research from the base line year provided the number of CHAMPUS patients living in Eisenhower's STS catchment area, the number of patients that had a surgical procedure captured under one of the three targeted DRGs, and the amount CHAMPUS and other health insurance companies had paid for the surgeries. Table 1 lists the results of the market research.

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<sup>17</sup> For this study, the data was organized according to the number of patients who were issued a statement of nonavailability from each of the eight military hospitals within the 200 mile STS catchment area. Each hospital is responsible for the 40 mile area surrounding their facility. Additionally, data was obtained for those patients with the STS catchment area who did not live within 40 miles of a military hospital. To avoid under estimating certain costs it was assumed non-catchment area patients lived at the outer most boundary of the 200 mile STS limit.

<b>Data Category</b>	<b>Total</b>
Population	346,873
Number of Surgeries	270
CHAMPUS Payments	\$1,408,842
Other Insurance Payments	\$1,206,772

**Table 1: Market Research - Baseline Year 1995**

Population data were obtained from the Resource Analysis Population System (RAPS) data base which data base provides not only current year population figures, but also information on past and future years. Dividing the number of surgeries by the population, ( $270 / 346,873 = .000778383$ ) yielded a percentage that would be used for determining future workload was obtained. Table 2 shows future population estimates according to the RAPS as well as future workload estimates.

	<b>1995</b>	<b>1997</b>	<b>1998</b>	<b>1999</b>	<b>2000</b>
<b>Population</b>	346,873	333,045	333,484	333,057	333,024
<b>Ratio</b>	.000778383	.000778383	.000778383	.000778383	.000778383
<b># Surgeries</b>	270	259	260	260	259

**Table 2: Future Population and Workload Estimates.**

To predict future for CHAMPUS payments, the average amount that CHAMPUS had paid for the 270 spinal surgeries from 1995 was calculated. For example, a cervical fusion, posterior technique was recorded, and paid for, under DRG 004, 214, and 215. This meant that in 1995, CHAMPUS and other insurance companies paid three different amounts for the same procedures. To determine the average cost per procedure, the costs of all procedures listed under the three DRGs were calculated together.

Using the 1995 total for CHAMPUS payments and dividing it by the number of procedures for the year (\$1,408,826 / 270), an average cost of \$5,218 was obtained. The average cost was then inflated by 3.8% each year through year 2000 to find the average cost per procedure per year. Each average cost per procedure was then multiplied by the corresponding number of procedures to determine the total estimated CHAMPUS payment for each year. The total payments for fiscal years 1998 - 2000 were then discounted<sup>18</sup> to 1997 dollars using a discount rate of 2.7% (OMB Circular A-94 1992). This value, \$4,474,069, was then added to the 1997 CHAMPUS payment of \$1,456,098, giving the status quo alternative a total net present value of \$5,930,167. Table 3 depicts the estimates of future CHAMPUS payments and the average cost per procedure for each year of the decision period.

	1995	1997	1998	1999	2000
# Surgeries	270	259	260	260	259
Inflation Rate		3.8%	3.8%	3.8%	3.8%
Cost/Surgery	\$5,218	\$5,622	\$5,836	\$6,057	\$6,288
Total Paid	\$1,408,826	\$1,456,098	\$1,517,360	\$1,574,820	\$1,628,598
NPV		\$5,930,167			
NP Cost/Surgery		\$5,713			

**Table 3: Net Present Value of the Status Quo Alternative.**

### SPINAL STS ANALYSIS

Costs relevant to spinal STS option were those for additional medical equipment, equipment maintenance, additional staff, operating room supplies, orthopaedic appliances, and patient travel, lodging and per diem costs. Additionally, the baseline year data for population,

<sup>18</sup> Most commercially available software programs have the formula for the discounted cash flow analysis already formatted within the spreadsheet. Microsoft Excel™ was used throughout this analysis.

workload, and the percentage of the population who had spinal surgery were also needed for the STS option. Finally, data was needed from the Medical Expense and Reporting System (MEPRS)<sup>19</sup>. The MEPRS data represents the additional variable costs to Eisenhower from service centers that directly support the increased number spinal surgeries. These service centers consume resources proportionate to the increase in volume of procedures performed at Eisenhower.

### **MEPRS Costs**

Several steps were required to calculate the MEPRS costs. MEPRS data were provided by the Eisenhower Resource Management Division to determine the variable MEPRS costs relevant to the spinal STS alternative. The top-down method described in Holmes' article, "Relevant Cost Decision Making," (1996) was used. Holmes tells the reader to (1) obtain the MEPRS data for the production center, in this case orthopaedics, that will be producing a new, or increased service, and then (2) review the data to determine what costs were placed into the production center and finally (3) to discard those from the service centers that do not provide immediate direct support for this service.

The data obtained from Resource Management provided the apportioned costs that were associated with 1,791 orthopaedic admissions at Eisenhower during 1995. The process action team decided to use 100 percent of the supply and labor costs from selected service centers, and to eliminate all other costs. The sum of the supply costs was \$484,891, and for labor, \$279,549. These values are total supply and labor costs from the service centers, identified by the process action team, that provided direct support for all of the orthopaedic procedures performed at Eisenhower during the baseline year and are not specific to spinal surgery.

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<sup>19</sup> MEPRS provides the only cost accounting data generally available in the MHSS. MEPRS apportions costs from service centers (such as the blood bank, food services, and office of the commander) into the various production centers such as orthopaedics and also separates the costs by type such as labor, supplies, and contracts.



The second step was to estimate the supply and labor costs specific for spinal surgery. This was done by dividing the totals for each by 1,791, the total for orthopaedic admissions for the year. These values were then multiplied by 270, the number of spinal surgeries performed under CHAMPUS during the baseline year. Using this technique, the total estimated variable supply cost is \$73,099, and the total variable labor cost is \$42,143. A summary of the identified service centers and the methodology for determining the variable costs is provided in Appendix 6.

For the next step, the number of surgeries performed under each of three targeted DRGs, and the relative weight for each DRG, were needed. Multiplying the number of procedures for each DRG by its weight, the relative value for each DRG was obtained. The relative values were then summed to provide the total relative value for the combined DRGs. The variable supply costs per DRG were then calculated by dividing the total variable supply costs by the total relative value for all DRGs. Finally, the variable supply cost per DRG was obtained by multiplying the DRG weight by the total relative value unit. Table 4 is a summary of the variable supply costs computations.

DRG	4	214	215	Total
Number surgeries per DRG (1995)	16	67	187	270
Relative weight of each DRG	2.3399	1.9255	1.1119	5.3773
Total relative value for all DRGs	37.4384	129.0085	207.9523	374.3722
Total variable supply costs				\$73,099
Variable supply cost/relative value unit				\$195.26
Variable supply cost per DRG	\$456.89	\$375.98	\$217.11	

**Table 4: Estimation of 1995 Variable Orthopaedic Supply Costs, DRGs 004, 214, and 215.**

The same procedure was used for determining the variable costs for labor and is summarized in table 5.

DRG	4	214	215	Total
Number of surgeries per DRG (1995)	16	67	187	270
Relative weight of each DRG	2.3399	1.9255	1.1119	5.3773
Total relative value for all DRGs	37.4384	129.0085	207.9523	374.3722
Total variable labor costs				\$42,143
Variable labor cost/relative value unit				\$112.57
Variable labor cost per DRG	\$263.40	\$216.75	\$125.17	

**Table 5. Estimation of 1995 Variable Orthopaedic Labor Costs DRGs 4, 214, and 215 (concept and format taken from Holmes 1996)**

To convert the 1995 values into future year values, the number of procedures per year was divided by 270. This provided the percentage of the 270 total procedures for each DRG. The resulting percentages are listed in table 6.

DRG	4	214	215	Total
1995	16	67	187	270
Per cent of Total Procedures	6%	25%	69%	100%

**Table 6. Percentage of Total Spinal Procedures by DRG.**

The DRG percentage of the total procedures for each DRG was then calculated for each year of the decision period. The results are listed in Table 7.

	1998	1999	2000
Estimated Procedures	260	260	259
DRG 004 (6%)	16	16	16
DRG 214 (25%)	65	65	65
DRG 215 (69%)	179	179	179

**Table 7: Estimated Number of Procedures by DRG**

The final step was to estimate MEPRS costs for supplies and labor for each year of the decision period. This was done using 1998 workload estimates for each DRG and multiplying those by their corresponding variable costs. Table 8 shows the variable supply costs, and table 9 the variable labor costs needed for the MEPRS input into the spinal STS alternative analysis.

DRG	VC/DRG	Procedures	Total
004	\$456.89	16	\$7,310.24
214	\$375.98	65	\$24,438.70
215	\$217.11	179	\$38,862.69
		260	\$70,611.63

**Table 8: Variable MEPRS Supply Costs.**

The same method was used to calculate the total variable labor costs for MEPRS.

DRG	VC/DRG	Procedures	Total
4	\$263.40	16	\$4,214.40
214	\$216.75	65	\$14,088.75
215	\$125.17	179	\$22,405.43
		260	\$40,708.58

**Table 9: Variable MEPRS Labor Costs.**

The values listed below in table 10 are those that were entered into the comprehensive analysis for the spinal STS alternative. The values were inflated, 1.42 percent<sup>20</sup> for supplies, and 1.81 percent<sup>21</sup> for labor.

<sup>20</sup> Inflation rate for supplies was obtained from the Bureau of Labor Statistics, January 1996 data.

<sup>21</sup> Inflation rate for labor was obtained from the Bureau of Labor Statistics, 4th quarter 1996 data.

	1998	1999	2000
MEPRS Supply	\$73,662	\$74,708	\$75,769
MEPRS Labor	\$42,631	\$43,403	\$44,118

**Table 10: MEPRS Costs After Inflation.**

### Equipment Start Up Costs

The process action team determined that additional equipment was needed to establish Eisenhower as an STS for spinal surgery. The costs for the equipment is listed below in table 11, and the source for the prices is provided at Appendix 3.

Item	Cost	#	Total
Stealth 3-D Guidance System	\$323,000	1	\$323,000
C-Arm Fluoroscopy Unit	\$155,710	1	\$155,710
Surgical Table	\$95,735	1	\$95,735
Cogent Headlight System	\$8,800	2	\$17,600
Microscope	\$184,700	1	\$184,700
View Boxes	\$1,093	2	\$2,185
View Box (Scoliosis)	\$293	1	\$293
Medical Drill	\$21,208	2	\$42,416
Micro Endoscopic Surgical Unit	\$40,050	2	\$80,100
Voice Dictation System	\$167,550	1	\$167,550
Cervical Retractor	\$4,950	1	\$4,950
Lumbar Retractor	\$16,000	1	\$16,000
Data Analysis Computer	\$3,400	1	\$3,400
Total			\$1,093,639

**Table 11: Spinal STS Equipment Requirements and Costs.**

The equipment would be procured in 1997 with funding provided by Health Affairs, which has to be reimbursed by Eisenhower within two years (Dunn 1996). Eisenhower would pay the money back, one-half in 1998, and one-half in 1999.

### Personnel Costs

The process action team also discussed what additional staff would be required to accommodate the increased number of spinal surgeries. Table 12 describes the type of additional staffing needed, the quantity of each, and the salary<sup>22</sup>.

Position	Quantity	Salary	Total
Orthopaedic Nurse	1	\$42,673	\$42,673
Operating Room Nurse	2	\$38,750	\$77,500
Orthopaedic Physician's Assistant	1	\$86,191	\$86,191
Health Systems Analyst	1	\$31,676	\$31,676
Medical Clerk	1	\$22,858	\$22,858
Nurse Anesthetist	2	\$107,235	\$214,470
Operating Room Technician	2	\$25,574	\$51,148
Total			\$526,516

**Table 12: Spinal STS Personnel Requirements and Costs.**

Salaries included base wages, a 25 percent benefit package, and for the nurse anesthetists, a twenty-five per cent incentive pay. The estimate of \$526, 516 was then inflated for each year of the decision period as listed in table 7.

	1998	1999	2000
Salary Costs	\$526,116	\$535,639	\$545,334

**Table 13: Estimated Cost for Additional Personnel After Inflation.**

<sup>22</sup> Salary and benefit figures provided by Eisenhower Resource Management Division.

### Orthopaedic Appliances Costs

Orthopaedic appliances that are inserted in certain patients to stabilize their spines were also considered. Because of the extreme cost of these appliances, the process action team wanted to include four sets of each type appliance in the start up costs. Four sets of appliances would ensure an adequate quantity to continue performing spinal surgeries and accommodate for any delays in resupply. Also included in the appliance start up package are endoscopes used to remove intervertebral discs, cervical collars and halo vests. The summary of the appliances to be included in the start up costs are listed at table 14.

Appliance	Qty	Price	Total
Anterior Technique Bone Dowel	1	\$53,855	\$53,855
Posterior Technique Bone Dowel	1	\$11,400	\$11,400
Spinal Rod System	1	\$80,000	\$80,000
Anterior cervical plate	1	\$33,700	\$33,700
Z-plate	1	\$38,700	\$38,700
Thoracic Z-plate	1	\$38,400	\$38,400
Cannulated Screw System	1	\$9,400	\$9,400
Axis Plate/Screw System	1	\$23,500	\$23,500
Cervical Collars	1	\$2,635	\$2,635
Cervical Clamp System	1	\$8,200	\$8,200
Halo Vests	1	\$2,400	\$2,400
Endoscopes	5	\$995	\$4,975
Total			\$307,165

**Table 14: Orthopaedic Appliance Start-up Costs.**

By examining the workload and the type of surgeries performed during the baseline year, the surgeons estimated they would use \$458,400 worth of appliances each year. Using a rate of

1.42 percent<sup>23</sup>, the appliance costs were inflated for 1998 - 2000 and are summarized below.

Appendix 5 provides a detailed summary of the analysis used to obtain the per year appliance costs.

	1998	1999	2000
Appliance Cost	\$464,909	\$471,511	\$478,206

**Table 15: Costs for Orthopaedic Appliances and Endoscopes After Inflation**

#### **Maintenance Costs**

Maintenance costs for the new equipment were also considered. All of the equipment procured for the spinal STS would remain under warranty for the first year, and some for two years. Using quotations obtained from sales representatives the maintenance costs were calculated for 1999 and 2000. Year 2000 was obtained by inflating \$45,000 by 10 percent<sup>24</sup>.

1999	2000
\$45,000	\$49,500

**Table 16: Maintenance Costs After Inflation.**

#### **Operating Room Supply Costs**

Supplies consumed in the operating room during spinal surgery were also considered. The different surgical procedures were placed into three general categories and the costs associated with each type were determined, and multiplied by the estimated number of procedures. Appendix 5 (same as for the appliances) provides a detailed analysis of the cost per procedure, and total estimated costs for supplies. Table 17 is the projected cost for operating room supplies used during the decision period.

<sup>23</sup> Bureau of Labor Statistics Produce Price Index, January 1996.

<sup>24</sup> 10 per cent estimated provided by Eisenhower Medical Maintenance.

1998	1999	2000
\$71,262	\$72,274	\$73,300

**Table 17: Operating Room Supply Costs After Inflation.**

### **Travel, Lodging and Per Diem Costs**

The final costs considered relevant for the STS alternative were those for travel, lodging, and per diem. Under the STS concept, if a patient is asked to travel more than 40 miles to Eisenhower for medical care they are reimbursed at a rate of 31 cents a mile, and \$30 a day for per diem. If they are required to spend the night in the Fort Gordon area, they are reimbursed up to \$52 per night for lodging. When the patients travel to Eisenhower for their surgery they are asked to bring an escort to drive them home after being discharged. Escorts are reimbursed for mileage, lodging and per diem.

To calculate per diem and travel costs, the 270 surgical cases from the base line year were reduced to 260<sup>25</sup>, the estimated number of cases to be performed in fiscal years 1998 and 1999. The number was reduced by eliminating one surgical case from each of the eight military treatment facilities located within the STS catchment area. Additionally one case from both Georgia and South Carolina (Appendix 2) was eliminated. This provided the predicted number of patients from each location within the STS catchment area that would be traveling to Eisenhower for spinal surgery.

The total number of days spent in the hospital after surgery was obtained from the RCMAS data and is reported in the length of stay (LOS) column. By dividing the length of stay by the number of surgeries, the average length of stay (ALOS) was found for each hospital. Eisenhower's Regional Referral Office provided the "Miles to Eisenhower" data. The distance from each hospital to Eisenhower was multiplied by 31 cents, multiplied again by six, and

<sup>25</sup> The estimated 260 surgical cases for fiscal years 1998 and 1999 were used in lieu of 259 estimated for fiscal years 1997 and 2000 providing a "worse case scenario." Table 2 describes the method for estimating future surgical cases.



multiplied by the number of surgeries to provide the costs associated with three round trips to Eisenhower<sup>26</sup>. This allowed for three trips to Eisenhower a pre-surgery, post-surgery and a surgical day trip for the patients.

Per diem rates for each hospital were calculated by multiplying the average length of stay by \$82, the cost for one day lodging and per diem, and multiplying again by the number of surgeries sent from each hospital to Eisenhower. The resulting product was multiplied again by 1.2 to allow for unexpected trips, or longer length of stays.

Total costs for each hospital were found by adding the costs of three round trips to the per diem column. The results are listed below in table 18.

Hospital Location	Total Surgeries	LOS	ALOS	Miles to Eisenhower	3 Round Trips	Per Diem: (x 1.2)	Total Costs
Ft. Benning	20	86	4.30	150	\$5,580	\$5,988	\$11,568
Ft. Stewart	12	50	4.17	129	\$2,879	\$3,593	\$6,472
Moody AFB	10	42	4.20	183	\$3,404	\$2,994	\$6,398
Robins AFB	17	63	3.71	152	\$4,806	\$5,090	\$9,896
Shaw AFB	6	27	4.50	115	\$1,283	\$1,796	\$3,080
Beaufort Naval	7	91	13.00	118	\$1,536	\$2,096	\$3,632
Chaleston AFB	78	214	2.74	136	\$19,731	\$23,354	\$43,085
Ft. Jackson	18	77	4.28	70	\$2,344	\$5,389	\$7,733
Georgia	55	156	2.84	200	\$20,460	\$16,468	\$36,928
SC	37	97	2.62	200	\$13,764	\$11,078	\$24,842
<b>Total</b>							<b>\$153,634</b>

**Table 18: Travel, Lodging and Per Diem Estimates.**

<sup>26</sup> The process action team wanted to budget for three trips for each patient. This would allow for a pre-surgery, post-surgery and a trip for their surgery.

The total estimated cost for travel and per diem is \$91,837 for the STS alternative. This value was then inflated by a rate of 2.1 percent<sup>27</sup> for 1998 - 2000.

1998	1999	2000
\$156,860	\$160,154	\$163,518

**Table 19: Travel, Lodging and Per Diem Costs After Inflation.**

### Spinal STS Summary

Table 20 summarizes the discounted cash flow analysis for the spinal STS option. The dollar signs in the 1997 column represent the amount paid for start up costs, \$1,093,639 for equipment, and \$307,165 for appliances. This money is entered into the analysis for 1998 and 1999, the years Eisenhower would pay back the start-up costs.

	1997	1998	1999	2000
Equipment	( \$\$\$ )	\$700,402	\$700,402	
Maintenance			\$45,000	\$49,500
Appliances/Scopes	( \$\$\$ )	\$464,909	\$471,511	\$478,206
Additional Staffing		\$568,731	\$579,025	\$589,506
MEPRS Supplies		\$73,662	\$74,708	\$75,769
MEPRS Personnel		\$42,631	\$43,403	\$44,188
Operating Room Supplies		\$71,262	\$72,264	\$73,300
Travel/Per Diem/Lodging		\$156,860	\$160,154	\$163,518
Total Paid/Year	( \$\$\$ )	\$2,078,458	\$2,146,477	\$1,473,987
NPV 1997-2000		\$5,419,676		
NP Cost per Surgery		\$5,221		

**Table 20: Net Present Value of Spinal STS Alternative.**

<sup>27</sup> Inflation rate of 2.1 per cent provided by the Fort Gordon, GA Finance and Accounting Office, Travel Section.

### THIRD PARTY INSURANCE

CHAMPUS eligible patients frequently have health insurance for health care costs not paid for by the government. The money paid to military hospitals by private insurance companies for services rendered is significant and was considered for this spinal STS financial analysis. During the baseline year, 183 of the 270 patients who had spinal surgery carried supplemental insurance that reimbursed in addition money to that paid by CHAMPUS. Military hospitals are also authorized to bill private insurance companies for services provided to patients they provide coverage to at a rate determined by DoD<sup>28</sup> (Assistant Secretary of Defense for Health Affairs 1996).

When a military hospital provides care to a CHAMPUS patient who has supplemental insurance, the insurance company is billed at an amount equal to the relative weighted value of the applicable DRG, multiplied by the billing rate for that year. Table 21 is a summary of the spinal STS DRGs, the estimated number of procedures billed under each, their relative weight, and the estimated third party insurance money available to Eisenhower.

DRG	# Procedures	Weight	Billing Rate	Weight x Rate	Total
004	2	2.3399	\$5,499	\$12,866	\$25,732
214	46	1.9255	\$5,499	\$10,588	\$487,048
215	135	1.1119	\$5,499	\$6,114	\$825,390
	183				\$1,338,170.

**Table 21: Estimated Yearly Third Party Insurance**

To estimate the third party insurance dollars available for the total decision period, the same number of insured patients and the billing rates were used. Because the billing rate fluctuates each fiscal year, the process action team decided to use the \$5,499 as the billing rate

<sup>28</sup> The billing rate for 1997 was \$5,499.

for each year of the decision period, rather than inflate or deflate the value. Table 22 summarizes the estimated third party money available to Eisenhower and the MHSS for the decision period.

	1997	1998	1999	2000
Third Party Money	\$0	\$1,338,170	\$1,338,170	\$1,338,170
NPV	\$3,807,101			

**Table 22: Net Present Value of Third Party Insurance Money.**

Part of the money collected would be used to repay Health Affairs for start-up costs and the remainder would be used at the discretion of Eisenhower and MHSS leaders.

### SENSITIVITY ANALYSIS

The results from the STS alternative were subjected to a sensitivity analysis. For this, each inflation rate in the formula was raised to 3.8%, then 5%, and finally 10% to determine if, or at what point, the STS alternative would become less cost effective if the status quo option inflation rate was left at 3.8%. Table 23 provides the results of the sensitivity analysis.

	NPV Status Quo (3.8%)	NPV STS	Difference
Current Rates	\$5,930,028	\$5,304,020	\$626,008
3.8%	\$5,930,028	\$5,367,542	\$562,486
5%	\$5,930,028	\$5,395,281	\$534,747
10%	\$5,930,028	\$5,512,176	\$417,852

**Table 23: Sensitivity Analysis.**

The sensitivity analysis demonstrated that if the inflation rate for CHAMPUS payments remained at a rate of 3.8% through year 2000 for the status quo option, the STS would still remain the more cost effective alternative even if the relevant costs of this option were to increase at a rate

of 10%. This analysis was important to the Eisenhower leadership because it provided a margin for error when estimating the various inflation rates.

### BREAK-EVEN ANALYSIS

This analysis<sup>29</sup> was conducted to help the decision makers determine the number of surgical cases which need to be performed at Eisenhower each year before a spinal STS becomes the more cost effective alternative. Appendix 4 provides a comprehensive summary of the break-even analysis and Table 24 displays the "break-even" point."

Status Quo	Spinal STS
Number of Procedures x average cost	Number of Procedures x average cost
121 x \$5,713 = \$691,273	139 x \$5,045 = \$701,255
122 x \$5,713 = \$696,986	138 x \$5,045 = \$696,210

**Table 24: Break-even analysis.**

The interpretation of the break-even analysis is that up to 121 of the estimated 260 spinal surgeries can be provided using the status quo option and still be more cost effective. At 122 surgeries, it becomes more cost effective to use the spinal STS alternative. Appendix 4 provides a comprehensive summary of the break-even analysis.

### CONCLUSION AND RECOMMENDATION

The leaders from Eisenhower, the Southeast Regional Medical Command, and the TRICARE Region 3 Lead Agent's office wanted to know whether it was (1) more cost effective to continue paying civilian providers CHAMPUS money to perform spinal surgeries, or (2) to establish a spinal STS at Eisenhower. The results of this financial analysis indicate that developing a spinal STS is the better alternative.

<sup>29</sup> This analysis was not a true break-even analysis as described in footnote 12. Rather it was used to measure how many spinal surgeries, at the net present average cost surgery, could be performed each using a combination of the two options before the Spinal STS option became more cost effective than the status quo.

Spinal surgeries can be provided more cost effectively using the STS option. These savings benefit not only the MHSS and Eisenhower, but could also increase profit margins for Humana by reducing the amount of CHAMPUS money it pays for these procedures. An Eisenhower spinal STS also offers the MHSS and Eisenhower the potential of earning revenue from private insurance companies. Collecting private insurance money is one of the few ways a military hospital has to make money. Moreover, development of a spinal STS at Eisenhower could benefit stakeholders in several other ways as well.

It could benefit readiness. Under the status quo option the majority of the spinal procedures in the Southeast Region are being performed by civilian surgeons. A spinal STS would increase the number of spinal procedures performed by military surgeons, better preparing them to accomplish their wartime missions. It could be expected that if military surgeons perform more spinal surgeries, their outcomes would be better. Better outcomes would mean a better quality of life for MHSS beneficiaries after their surgeries, and an increased number of soldiers, sailors, marines and airmen returned to duty. By returning the deploying force to duty, the readiness posture of the military is increased and medical disability payments are decreased.

Graduate medical education at Eisenhower would also benefit from a spinal STS. Interns and resident physicians, especially those training in orthopaedics, would be exposed to greater number of the spinal surgery patients. Assisting or observing during surgery, as well as following the patients in their post operative care and rehabilitation would help round out their medical education making them better physicians regardless of the specialty in which they are training.

A spinal STS could also be the building block for a future, comprehensive neuroscience STS at Eisenhower. Although, only a concept at this time, a neuroscience STS would include

not only spinal surgery, but also pediatric and adult neurosurgery, and a national gamma knife<sup>30</sup> STS. The gamma knife service line would require a large investment in both capital and personnel and could possibly require a joint venture with one or more health care organizations. Because of existing agreements with the Medical College of Georgia and the Augusta Veterans Administration Medical Center for neurosurgical services, these two organizations would be logical to consider in that regard<sup>31</sup> (Lee 1995).

The MHSS is at the leading edge of telemedicine technology. To provide medical support to US forces it has fielded the most advanced telemedicine system in history (Brewin and Bass 1996). At Eisenhower, a special project called the Center for Total Access is developing a comprehensive telemedicine network through which specialists provide regional medical care to patients at other military hospitals. Telemedicine will enable surgeons from Eisenhower to diagnose and coordinate care for spinal surgery patients without leaving Fort Gordon. This would provide consistent care throughout the region, increase access, reduce unnecessary travel for the beneficiaries and physicians, provide more efficient pre and post-operative care, and reduce in-patient length of stays, ensuring that Eisenhower facilities and personnel are better utilized.

At a Board of Directors meeting on February 13, 1997, the Commander speculated that Eisenhower has a good chance of remaining as one of the MHSS' medical centers. However, he told those present at the meeting that the hospital must change the way it provides care to remain

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<sup>30</sup> A Gamma Knife is a highly technical surgical instrument that uses a focused dose of radiation, delivered from multiple portals evenly distributed around a patient's head, to destroy targeted tissue (Lee 1995). Because of its expense, sophistication, and the training required for a physician to obtain credentials to use the Gamma Knife, it would be a separate component of a neurosciences STS.

<sup>31</sup> Presently Eisenhower is involved in various arrangements with these organizations to include pediatric and adult neurosurgery. There has been intermittent discussions regarding how the three organizations could fund and share a Gamma Knife.

valuable to the military. The following were some of the comments made by the Eisenhower Commander at the that meeting.

Eisenhower's future begins with a robust primary care network. This network must be responsive to the beneficiaries and ensure timely access and quality care. Some specialty service lines at Eisenhower will be eliminated and patients requiring those services will be referred to an established network of civilian providers. Other specialties, possibly orthopaedics and the neurosciences, will be retained and expanded. The selection of services to be retained will be based primarily on readiness, but also graduate medical education.

In the future, graduate medical education in the United States will fall on hard times. This makes it imperative that Eisenhower nurture the relationships it has with the Augusta Veterans Affairs Medical Center and the Medical College of Georgia. Military physicians training at Eisenhower may be rotate through these hospitals to ensure they are seeing the required number and mix of patients. Resident physicians training at Augusta civilian hospitals could receive part of their education at Eisenhower treating military patients. A comprehensive neuroscience residency program could only be accomplished in collaboration with the Augusta VA and Medical College of Georgia.

Finally, a fully integrated health care delivery system must be created. Integrated health care requires that all members of the healthcare team meet with the patients to discuss therapy to include discharge planning and outpatient care. By expanding and utilizing telemedicine to its full capacity integration can be expanded (Xenakis 1997).

The future for Eisenhower, as with most of the MHSS' military hospitals is uncertain, and will depend a great deal on the number of military personnel left on active duty, and which military installations survive. Implementing a spinal STS is a logical fit into the vision of the Eisenhower Commander for making Eisenhower a valued resource to the military in the future. Based on the results of this financial analysis Eisenhower should be designated as a spinal surgery STS.



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**OFFICE OF THE ASSISTANT SECRETARY OF DEFENSE (HEALTH AFFAIRS)  
SPECIALIZED TREATMENT SERVICE (STS) FACILITY PROGRAM  
CENTRAL FUNDING SUPPORT WORKSHEET FORMAT**

**1. IDENTIFYING INFORMATION:**

**1.1 Military Treatment Facility**

**1.2 STS facility title**

**1.3 MTF Point of Contact (name, duty position, phone, fax, email)**

**2. MARKET ANALYSIS.**

**2.1 Estimate the expected number of beneficiaries to use the STS. Provide number of beneficiaries by age, sex, and beneficiary category for 40 and 200 mile catchment areas, according to the size area for which the facility is applying for STS status. Separately list beneficiaries from adjoining TRICARE regions as necessary for multi-regional STS facilities.**

**2.2 Determine the number of beneficiaries in the catchment area of the STS in the past 12 months who have used the services to be provided by the STS. Include those who have used the services within the MTF as well as CHAMPUS for 40-mile or 200-mile radius from the MTF, according to the size area for which the facility is applying for STS status. Provide CHAMPUS costs, broken out by military service. For national STS facilities, provide the information for the service from the CHAMPUS database for the United States.**

**2.3 Estimate the number of beneficiaries with third party insurance likely to use the STS. Indicate, if known, the best estimate of those covered with other primary insurance, third-party liability, and both.**

**3. COST ANALYSIS. For each service defined above provide the following, citing data source and method of determination. The following information is needed, broken out by each DRG or CPT code identifying a service to be provided:**

**3.1 The CHAMPUS average cost per episode. Define the episode, for example, hospitalization and cardiac surgery only, cardiac surgery and a preoperative evaluation, or a preoperative evaluation, the surgery, and several postoperative visits. Include only those costs for the most recent 12-month measurable period and only for services being offered by the proposed STS.**

**3.2 The CHAMPUS allowable cost per episode, using the rates in effect during the 12 month period referenced in 3.1.**

**3.3 The MTF cost per episode. Include only those costs for the most recent 12-month measurable period and only for services being offered by the proposed STS. Provide best estimate if confirmed data are not available. Show that total government costs of providing care in the STS facility are in the aggregate less than the total government costs of providing care under CHAMPUS or than the TRICARE contractor has negotiated in nongovernment facilities.**

**3.4 Other Costs.** Indicate any up-front service or start-up costs, to include additional equipment, clinical, or administrative support costs.

**3.5** Indicate sustainment costs and sources of funding. Include ability to adjust funding based on experience if actual workload differs from estimates. Include ability to support sustainment costs after the initial year of central funding support.

**4. SUPPORT SERVICES ANALYSIS.** For both outpatients and nonmedical attendants, indicate the availability and cost of:

**4.1** Lodging on post and/or off post.

**4.2** Food service/per them costs

**4.3** Transportation, military and civilian

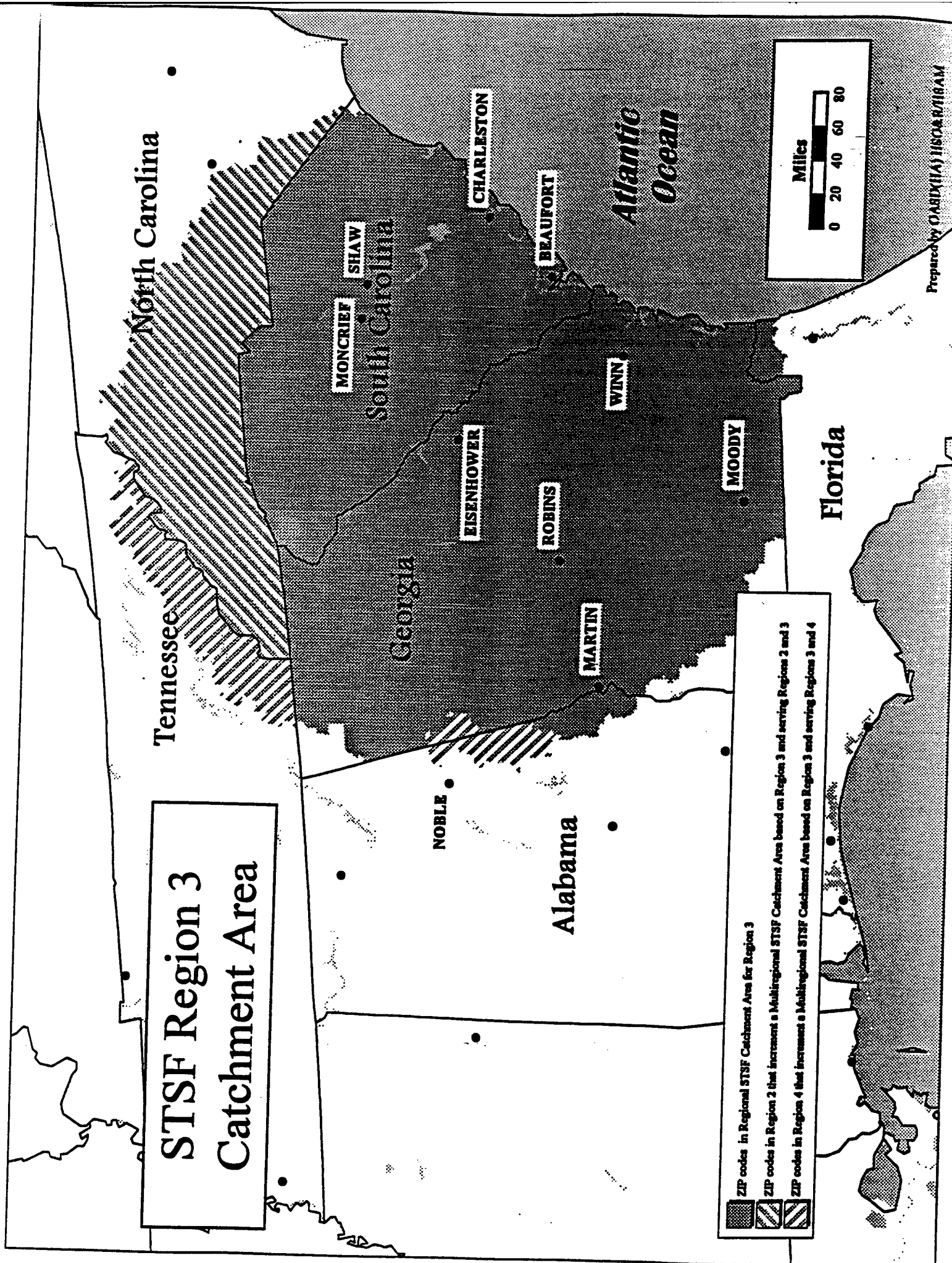
**5. BUSINESS CASE JUSTIFICATION.** Justify the need for funding in excess of the capability of the MTF and the parent Service. Describe the requested funding as one-time start-up, loan, or other.

#### **APPROVAL AND ROUTING PROCESS:**

The approval and routing process for central STS funding support is separate from the basic STS approval sequence which is described in the ASD(HA) policy memorandum of October 1995. Once a facility has received MTF approval, parent Service concurrence, Lead Agent approval, and ASD(HA) approval in the case of multi-regional or national facilities, the STS goes into effect 30 days after publication of a Federal Register notice on its behalf by ASD(HA).

Approved facilities with a central funding support requirement should prepare the above information for signature by the MTF commander, and forward the package through its parent Service command channels to Office of the Assistant Secretary of Defense (Health Affairs), ATTN: COL Michael Dunn, Room 3D360 Pentagon, Washington, DC 20301-1200.

To expedite processing, facilities are strongly encouraged, subject to the concurrence of their parent Service, to provide OASD(HA) an advance copy of their package by fax so that representatives of the Service financial managers and OASD(HA) staff can review the information and obtain any clarifications. Fax the advance copy to COL Dunn at (703) 693-2548. From the time the formal package is received at OASD(HA), a funding decision will be made within 30 days.



## **Sources for Equipment and Maintenance**

### **Medicraft**

503 Oak Place, Suite 575  
Atlanta, GA 30349

Stealth 3-D Guidance System  
Micro-endoscopic Surgical Unit  
Medical Drills  
Cervical Retractor  
Lumbar Retractor  
Appliances

### **Cappai Medical**

4016 Flowers Road, Suite 460  
Atlanta, GA 30360

Microscope

### **OEC Medical Systems**

3724 National Drive, Suite 113  
Raleigh, NC 27612

Digital Mobile C-Arm Fluorography Unit

### **Kurzweil Applied Intelligence**

11350 Random Hills Road, Suite 800  
Fairfax, VA 22030

Voice Dictation System

### **Neuro-Tec**

3068 Grist-Mill Drive  
Acworth, GA 30101

Cogent Headlight System

### **Picker International, Inc.**

2915 Courtyards Drive, Suite C  
Norcross, GA 30071

View Boxes

### **OSI, Inc.**

30031 Ahern Avenue  
Union City, CA 94587

Surgical Table

## Break-even Analysis

<b>Workload</b>	<b>Status Quo</b>	<b>STS</b>	<b>Workload</b>
	<b>\$5,713</b>	<b>\$5,045</b>	
0	\$0	\$1,311,700	260
1	\$5,713	\$1,306,655	259
2	\$11,426	\$1,301,610	258
3	\$17,139	\$1,296,565	257
4	\$22,852	\$1,291,520	256
5	\$28,565	\$1,286,475	255
6	\$34,278	\$1,281,430	254
7	\$39,991	\$1,276,385	253
8	\$45,704	\$1,271,340	252
9	\$51,417	\$1,266,295	251
10	\$57,130	\$1,261,250	250
11	\$62,843	\$1,256,205	249
12	\$68,556	\$1,251,160	248
13	\$74,269	\$1,246,115	247
14	\$79,982	\$1,241,070	246
15	\$85,695	\$1,236,025	245
16	\$91,408	\$1,230,980	244
17	\$97,121	\$1,225,935	243
18	\$102,834	\$1,220,890	242
19	\$108,547	\$1,215,845	241
20	\$114,260	\$1,210,800	240
21	\$119,973	\$1,205,755	239
22	\$125,686	\$1,200,710	238
23	\$131,399	\$1,195,665	237
24	\$137,112	\$1,190,620	236
25	\$142,825	\$1,185,575	235
26	\$148,538	\$1,180,530	234
27	\$154,251	\$1,175,485	233
28	\$159,964	\$1,170,440	232
29	\$165,677	\$1,165,395	231
30	\$171,390	\$1,160,350	230
31	\$177,103	\$1,155,305	229
32	\$182,816	\$1,150,260	228
33	\$188,529	\$1,145,215	227



34	\$194,242	\$1,140,170	226
35	\$199,955	\$1,135,125	225
36	\$205,668	\$1,130,080	224
37	\$211,381	\$1,125,035	223
38	\$217,094	\$1,119,990	222
39	\$222,807	\$1,114,945	221
40	\$228,520	\$1,109,900	220
41	\$234,233	\$1,104,855	219
42	\$239,946	\$1,099,810	218
43	\$245,659	\$1,094,765	217
44	\$251,372	\$1,089,720	216
45	\$257,085	\$1,084,675	215
46	\$262,798	\$1,079,630	214
47	\$268,511	\$1,074,585	213
48	\$274,224	\$1,069,540	212
49	\$279,937	\$1,064,495	211
50	\$285,650	\$1,059,450	210
51	\$291,363	\$1,054,405	209
52	\$297,076	\$1,049,360	208
53	\$302,789	\$1,044,315	207
54	\$308,502	\$1,039,270	206
55	\$314,215	\$1,034,225	205
56	\$319,928	\$1,029,180	204
57	\$325,641	\$1,024,135	203
58	\$331,354	\$1,019,090	202
59	\$337,067	\$1,014,045	201
60	\$342,780	\$1,009,000	200
61	\$348,493	\$1,003,955	199
62	\$354,206	\$998,910	198
63	\$359,919	\$993,865	197
64	\$365,632	\$988,820	196
65	\$371,345	\$983,775	195
66	\$377,058	\$978,730	194
67	\$382,771	\$973,685	193
68	\$388,484	\$968,640	192
69	\$394,197	\$963,595	191
70	\$399,910	\$958,550	190
71	\$405,623	\$953,505	189

#### Appendix 4

72	\$411,336	\$948,460	188
73	\$417,049	\$943,415	187
74	\$422,762	\$938,370	186
75	\$428,475	\$933,325	185
76	\$434,188	\$928,280	184
77	\$439,901	\$923,235	183
78	\$445,614	\$918,190	182
79	\$451,327	\$913,145	181
80	\$457,040	\$908,100	180
81	\$462,753	\$903,055	179
82	\$468,466	\$898,010	178
83	\$474,179	\$892,965	177
84	\$479,892	\$887,920	176
85	\$485,605	\$882,875	175
86	\$491,318	\$877,830	174
87	\$497,031	\$872,785	173
88	\$502,744	\$867,740	172
89	\$508,457	\$862,695	171
90	\$514,170	\$857,650	170
91	\$519,883	\$852,605	169
92	\$525,596	\$847,560	168
93	\$531,309	\$842,515	167
94	\$537,022	\$837,470	166
95	\$542,735	\$832,425	165
96	\$548,448	\$827,380	164
97	\$554,161	\$822,335	163
98	\$559,874	\$817,290	162
99	\$565,587	\$812,245	161
100	\$571,300	\$807,200	160
101	\$577,013	\$802,155	159
102	\$582,726	\$797,110	158
103	\$588,439	\$792,065	157
104	\$594,152	\$787,020	156
105	\$599,865	\$781,975	155
106	\$605,578	\$776,930	154
107	\$611,291	\$771,885	153
108	\$617,004	\$766,840	152
109	\$622,717	\$761,795	151
110	\$628,430	\$756,750	150
111	\$634,143	\$751,705	149
112	\$639,856	\$746,660	148

#### Appendix 4

113	\$645,569	\$741,615	147
114	\$651,282	\$736,570	146
115	\$656,995	\$731,525	145
116	\$662,708	\$726,480	144
117	\$668,421	\$721,435	143
118	\$674,134	\$716,390	142
119	\$679,847	\$711,345	141
120	\$685,560	\$706,300	140
121	\$691,273	\$701,255	139
122	\$696,986	\$696,210	138
123	\$702,699	\$691,165	137
124	\$708,412	\$686,120	136
125	\$714,125	\$681,075	135
126	\$719,838	\$676,030	134
127	\$725,551	\$670,985	133
128	\$731,264	\$665,940	132
129	\$736,977	\$660,895	131
130	\$742,690	\$655,850	130

# Appliance and Operating Room Supply Cost Estimates

	Quantity	Cost/item	Total Cost	Number	Supply Total	Appliance Total
<b>Laminectomy and Micro-discectomy</b>						
Major Basin Tray	1	\$17	\$17			
Laminectomy Tray	1	\$15	\$15			
Laparotomy t-sheet	1	\$10	\$10			
Medium Drape	2	\$3	\$5			
gloves	8	\$4	\$32			
suture	4	\$10	\$40			
Hand towel pack	2	\$16	\$32			
SCD Stockings	1	\$45	\$45			
			\$196	162	\$31,752	scopes x 142
<b>Anterior Cervical Discetomy and Fusion</b>						
Major Basin Tray	1	\$17	\$17			
Laninectomy tray	1	\$15	\$15			
Shoulder pack	1	\$195	\$195			
medium drape	2	\$3	\$5			
hand towel pack	2	\$16	\$32			
powdered gelfoam	1	\$30	\$30			
thrombin	1	\$8	\$8			
200 cc syringe	1	\$1	\$1			
10 cc syringe	2	\$1	\$2			
14 ga angiocath	2	\$1	\$2			
scd stockings	1	\$45	\$45			
foley catheter	1	\$8	\$8			
gloves	8	\$4	\$32			
suture	4	\$10	\$40			
kerlex roll	2	\$1	\$2			
silk tape, 3"	1	\$2	\$2			
			\$435	27	\$11,748	Appliance
<b>Posterior Lumbar Fusion</b>						
Major basin tray	1	\$17	\$17			
laminectomy tray	1	\$15	\$15			
lapanotomy t-sheet	1	\$10	\$10			
back table cover	1	\$2	\$2			
medium drape	2	\$3	\$6			
hand towel pack	2	\$16	\$32			
4 x 8 raytex	1	\$30	\$30			
lapanotomy sponge	2	\$10	\$20			
powdered gelfoam	2	\$30	\$60			
thrombin	2	\$8	\$16			
10 cc syringe	2	\$1	\$2			
20 cc syringe	1	\$1	\$1			
14 ga angiocath	2	\$1	\$2			
scd stockings	1	\$45	\$45			
foley catheter	1	\$8	\$8			
gloves	8	\$4	\$32			
suture	5	\$10	\$50			
gelfoam	1	\$29	\$29			
			\$377	71	\$26,767	Appliance
<b>Total</b>				<b>260</b>	<b>\$70,267</b>	<b>\$4,000</b> <b>\$6,200</b> <b>\$284,000</b> <b>\$458,400</b>

### MEPRS Costs for Spinal Surgery

Work Center	Supply	Labor
Pharmacy	\$228,169	\$53,165
Clinical Patholgy	\$16,969	\$16,873
Anatomical Pathology	\$1,444	\$4,246
Blood Bank	\$4,571	\$9,186
Diagnostic Radiolgy	\$19,966	\$26,500
EKG	\$65	\$1,407
EEG	\$12	\$0
Pulmonary Function	\$42	\$294
Anesthesia	\$118,512	\$78,425
Recovery Room	\$54,764	\$66,236
Respiratory Therapy	\$547	\$2,990
Nuclear Medicine	\$2,745	\$2,099
MICU	\$3,379	\$2,548
SICU	\$2,580	\$11,593
CCU	\$1,167	\$2,062
Hospital Treasurer	\$5	\$378
Food Service	\$29,954	\$1,547
<b>Total</b>	<b>\$484,891 /</b>	<b>\$279,549 /</b>
<b>FY 95 Eisenhower Orthopaedic Admission</b>	<b>1791 =</b>	<b>1791 =</b>
<b>MEPRS Cost/Orthopaedic Admission</b>	<b>\$271 x</b>	<b>\$156 x</b>
<b>FY95 CHAMPUS Spinal Procedures</b>	<b>270 x</b>	<b>270 x</b>
<b>Total MEPRS Costs</b>	<b>= \$73,099</b>	<b>= \$42,143</b>